752

标题: Research of THz wave detector based on bi-material micro-cantilever arrays

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摘要: The paper describes a new THz wave detector. The bi-material of niobium nitride and aluminum, which has a large difference in thermal expansion coefficient, is used to fabricate the micro-cantilever arrays of substrate-free using MEMS technology. The niobium nitride is used to absorb THz, and aluminum is used as the deformation material. The method of software simulation is used to research the optimum thickness ratio of the bi-material for the best design of the micro-cantilever. In addition, in order to prevent the heat diffusion, the micro-cantilever arrays is placed in a vacuum chamber which has the function of vibration prevention using the mechanical pump and molecular pump to keep the high vacuum degree for improving the signal to noise ratio of the detection system. The reflection type visible light optical readout system is used to acquire the THz wave information indirectly. Furthermore, the method of difference processing is used to process image for improving systemic resolution. At last, a THz source with a power of 5mW and a frequency of 973GHz is used for detection experiment, and the data processing results show that the micro-cantilever has deformed.

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